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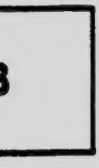

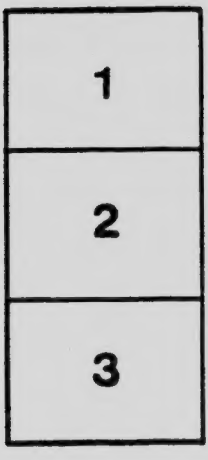

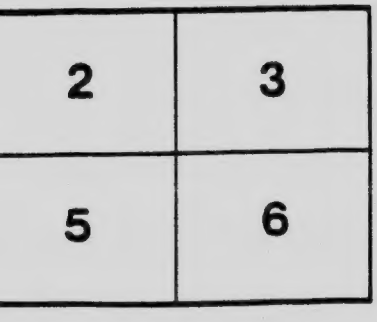

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REPORT

OF THE

CANADIAN ARCTIC EXPEDITION 1913-18

VOLUME VIII:

MOLLUSKS, ECHINODERMS, COELENTERATES, Etc.

PART B:

CEPHALOPODA - - By S. Stillman Berry

PTEROPODA - - - By William Healey Dall

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OTTAWA
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1922

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Report of the Canadian Arctic Expedition, 1913-18

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The Cephalopoda Collected by the Canadian Arctic Expedition, 1913-18

By S. Stillman Berry,

Redlands, California.

The cephalopods collected by the Canadian Arctic Expedition during the years 1913 to 1916 comprise only a few fragments, principally mandibles, taken from the stomachs of two species of seals, the Bearded Seal, *Erignathus barbatus* (Erxleben), and the Common Rough Seal, *Phoca hispida* Schreber. In the light of present knowledge alone, proper identification of such material at the very least account is hazardous. But from the notes, and more especially from the figures given, it is just possible that a way will be left open for throwing a more illuminating light upon the material at some time in the future.

It is hoped that the bibliographical portion of the present paper may prove of more immediate utility. It is unfortunate that knowledge of the cephalopods of the American Arctic is so incomplete, scattering, and fragmentary, as the study of this list shows.

Material Collected

For convenience in reference, the material collected is listed in order according to the numbers under which it is entered in the author's card register.

[726]

Numerous fragments taken from stomach of *Phoca hispida* Schreber, station 29*f*, ca. 30 fathoms, lat. 70° 13′ N., long. 140° 50′ W., a little east of Alaska-Yukon boundary, April 4, 1914.

The material here entered consists of 3 fragmentary and semi-digested buccal masses of cephalopods, together with a few odd shreds of tissue and some 58 fragments of beaks, the latter consisting of *half* mandibles only. Not even those persisting in the buccal tissues are entire. Each is split mesially. Evidently the median region of the mandibles is not only narrow in this species but more than ordinarily weak. In fact, one is reminded very much of the appearance of the valves of the chiton *Schizoplax* after the dissolution of the median uncalcified wedge. There are other peculiarities of shape and proportion (Fig. 1). On the whole the mandibles are fairly uniform in size. None

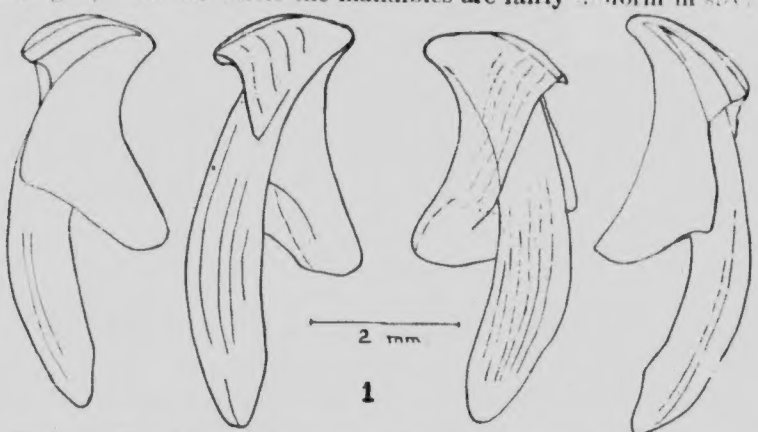

Fig. 1.—The four mandibular fragments from the buccal mass of a cephalopod taken at Station 29*f* [726]; camera outline; the two outermost figures are internal views.

are very large, particularly in comparison with the relatively enormous size of the buccal mass. Such structures should surely be identifiable with the passage of time—consequently it seems worth while to add figures of the four fragments dissected from the best preserved of the buccal masses. It is not, however, a glad commentary on the sufficiency of our knowledge regarding animals possessing such importance in the economy of the sea as these, that without more complete specimens or a better base of attack than is afforded by the literature, one dares not risk a guess at even the genus or family of cephalopods represented by the fragments.

[727]

1 mandible from stomach of *Phoca hispida* Schreber, station 29*f*, about 30 fathoms, lat. 70° 13′ N., long. 140° 50′ W., a little east of Alaska-Yukon boundary, April 4, 1914.

A single dorsal mandible from the same stomach as the specimens entered as No. 726 is larger than the others, altogether differently shaped, and entire. Its cutting edge is sharp and strongly curved, as in many decapods (Fig. 2). It clearly represents a quite different species.

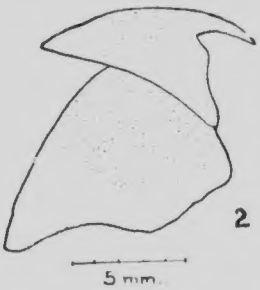

Fig. 2. Mandible of cephalopod from Station 29*f* [727], camera outline.

[728]

1 mandible from stomach of *Erignathus barbatus* (Erxleben), Station 42*u*, Bernard harbour, Dolphin and Union strait, Northwest Territories, October 22, 1915.

This is a single dorsal mandible somewhat resembling No. 727, but with the cutting edge appreciably shorter and stouter (Fig. 3). This specimen, which is preserved dry, is very likely representative of a third species.

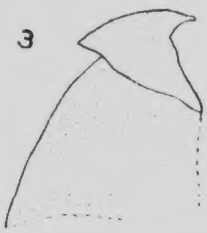

Fig. 3. Mandible of cephalopod from Station 42*u* [728], camera outline, same scale as Fig. 2.

In the diary of Captain Robert A. Bartlett, Report of the Department of the Naval Service for the Fiscal Year ending March 31, 1915, Ottawa, p. 35, there is an entry under Nov. 21st, (1913): "10 a.m. Sounding, 36 fathoms. Dredge to-day secured an octopus . . . . . Lat. 72° 56′— Long. 163° 54′W. at 5 p.m." All the specimens secured by Mr. James Murray, marine biologist and the scientific staff of the *Karluk* during the drift northwest of Alaska in 1913 were lost with the ship north of Herald island, on January 11, 1914.

Bibliography

It has been suggested that a bibliography for the Cephalopoda of the American Arctic would be found useful in connection with other bibliographies appearing in this series of papers. Defining the American quadrant as those Arctic waters lying between Davis and Bering straits, with possibly the 60th parallel as an arbitrary southern boundary, the following list of titles has been compiled as a contribution to this end. It is thought to be complete, at least to the point of serviceability, if unfortunately not to that of perfection. No attempt is here made to correct the synonymy quoted.

A few titles included have not been available for consultation and are consequently quoted from the citations of other authors. Such are enclosed in brackets.

Dall, W. H.

1884. New or specially interesting shells of the Point Barrow Expedition. Proceedings United States National Museum, v. 7, pp. 523-526, pl. 2. f. 8, 1884.

Records *Octopus grönlandicus* from Point Barrow, Alaska.

Dewhurst, H. W.

1834. The natural history of the order Cetacea, and the oceanic inhabitants of the Arctic regions. p. i—xx, 1—294 (331), with numerous pls. and figs., 8 vo., London, 1834.

Contains note on *Sepia groenlandica*, n. sp. (*nomen nudum*, p. 263), from "Greenland Seas," and various references to cephalopods as food of Arctic whales.

Eschricht, D. F.

1836. Cirroteuthis Mülleri, eine neue Gattung der Cephalopoden bildend. Acta Academiae Caesareæ Leopoldino Carolina Naturæ Curiosorum, v. 18, p. 627–634, pl. 46-48, 1836.

Cirroteuthis Mülleri, n. gen. and sp. described from Jacobshavn, Greenland.

Fabricius, O.

[1780. Fauna Groenlandica. 8vo, Hafniæ et Lipsiæ, 1780, pp. 358-60.]

Records *Sepia loligo* and *S. octopodia* from Greenland.

Grieg, J, A.

1896. Bidrag til kundskaben om Vestlandets mollusker. Bergens Museums Aarbog, no. 10. pp. 1-33, pl. 1, 1896.

Records *Rossia glaucopis* from 100-150 fath.,off Kraakøskallen; 120 fath., off Baardshaug, Selbjørnefjorden; and 60-70 fath., Hjeltefjorden.

Sepiola rondeletii from Kraakøskallen and Godøsund, Greenland.

1909. Brachiopods and mollusks with a supplement to the echinoderms. Report 2nd Norwegian Arctic Expedition in the *Fram*, 1898–1902, No. 20, pp. 1-45, pl. 1, October, 1909.

Records *Rossia palpebrosa* from 8 m., entrance to Stordalen, Havnefjord, Ellesmere island.

Hoyle, W. E.

1886. Report on the Cephalopoda collected by H.M.S. *Challenger* during the years 1873-76. Voyage of the *Challenger*, v. 16, pt. 44, pp. i-vi, 1-246, text f. 1-10, map, pl. 1-33, 1886.

On p. 222 gives summary of the then known cephalopod fauna of the Arctic faunal region, listing 9 species, referable to 6 genera.

MÖLLER, H. P. C.

1842. Index Molluscorum Groenlandiæ. Naturhistorisk Tidskrift, v. 4, p. 76-97, 1842.

Lists following cephalopods from Greenland:

Onychoteuthis Fabricii
Onychoteuthis? amoena n. sp.
Rossia palpebrosa
Cirroteuthis Mülleri
Octopus granulatus

MÖRCH, O. A. L.

[1857. Fortegnelse over Groenlands Bloeddyr (Mollusca Groenlandica). Naturh. Tillaeg til en Faunistisk og Statistisk beskrivelse af Groenland (H. Rink), pp. 75-100, Kjobenhavn, 1857.]

Following Greenland cephalopods listed on pp. 88-89 (*teste* Johansen).

Octopus groenlandicus
Cirroteuthis Muelleri
Jakobshavn
Rossia palpebrosa
Rossia Moelleri
Leachia hyperborea
Gonatus Fabricii
Amikok
? *Sepiola atlantica*

OWEN, R.

1834. Mollusca—Cephalopoda (with preliminary note by J. C. Ross). Narrative Second Voyage in Search of a North-West Passage, etc., by Sir John Ross, C.B., etc., Appendix, Natural History, pp. xcii-xcix, pl. B, f. 1, pl. C, June, 1834. (Complete work dated 1835).

Records *Rossia palpebrosa* n. gen. and sp. from Elwin bay, Prince Regent's inlet. [Somerset island, Regent inlet.]

PFEFFER, G.

1908. Cephalopoda. Nordisches Plankton, 9 Lief., pt. 4, pp. 1-116, text f. 1-120, 1908.

1912. Die Cephalopoden der Plankton-Expedition. Zugleich eine monographische Übersicht der oegopsiden Cephalopoden. Ergebnisse Plankton-Expedition der Humboldt-Stiftung, Bd. 2, pp. i-xxi, 1-815, atlas of 48 pls., 1912.

On p. 241 records *Gonatus fabricii* from Umanak and Disco, Greenland. Brief discussion of Arctic fauna on pp. 793-797.

POSSELT, H. J.

1898. Grønlands Brachiopoder og Blöddyr. Meddelelser om Grønland 23, pp. i-xix, 1-298, pl. 1-2, map, 1898.

Contains the following West Greenland locality records (pp. 269-283):

Cirroteuthis Mülleri
Jakobshavn
North Greenland.

Octopus arcticus
Julianehaab
Ivigtut
Lat. 65° 36′ N., long. 56° 24′ W.
Holstensborg.

Rossia palpebrosa
West Greenland.

Rossia Møllerí
West Greenland.

Rossia sublevis
289 fath., lat. 65° 30′ N., long. 55° 26′ W.
349 fath., lat. 65° 36′ N., long. 56° 24′ W.
235 fath., lat. 66° 49′ N., long. 56° 28′ W.

Rossia glaucopis
West Greenland.

Rossia Hyatti
25–35 fath., Umanak
40 fath., Prøven.

Rossia megaptera
349 fath., lat. 65° 36′ N., long. 56° 24′ W.

Spirula
Waigat, lat. 69° 44′ N.

Illex illecebrosus
Frederikshaab.

Architeuthus sp.
Holstensborg.

Gonatus Fabricii
Julianehaab, Ivigtut, Godthaab, Sukkertoppen, Egedesminde, Christianshaab, Jakobshavn, Godhavn, Ritenbenk, and Umanak.

Taonius hyperboreus
North Greenland.

PROSCH, V.

1847. Nogle nye Cephalopoder, beskrevne og anatomisk undersögte. Kongelige Danske Videnskabernes Selskabs Skrifter (5), naturvidenskabelig og mathematisk Afdeling, v. 1, pp. 53-72 [1-20], pl., 1847.

Octopus arcticus n. sp., described from Greenland.

REINHARDT, J. T., AND PROSCH, V.

1846. Om Sciadephorus Müleri (Eschr.). Kongelige Danske Videnskabernes Selskabs Skrifter, v. 12, pp. 165-224 [1-40], pl. 1-5, 1846.

STEENSTRUP, J. J. S.

1856. Hectocotyldannelsen hos Octopodslaegterne Argonauta og Tremoctopus, oplyst ved Iagttagelse af lignende Dannelser hos Blaeksprutterne i Almindelighed. Videnskabernes Selskabs Skrifter (5), naturvidenskabelig og mathematisk Afdeling, v. 4, pp. 185-216, pl. 1-2, 1856.

On p. 200 describes *Leachia hyperborea* n. sp. from North Greenland.

1857. Hectocotylus-formation in Argonauta and Tremoctopus explained by observations on similar formations in the Cephalopoda in general. Annals and Magazine Natural History (2), v. 20, pp. 81-114, pl. 2-3, August, 1857.

An English translation of preceding paper, the reference to *Leachia hyperborea* being found in the footnote on p. 96.

1861. Overblik over de i Kjöbenhavns Museer opbevarede Blaeksprutter fra det aabne Hav (1860-61). Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandlinger 1861, pp. 69-86 [1-18], 1861.

1880. Orientering de Ommatostrephagtige Blæksprutters indbyrdes Forhold. Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandlinger 1880, pp. 73-110 [1-40], 13 f. in text, pl. 3, 1880.

Note on distribution of *Todarodes* and *Ommatostrephes* on p. 107. *Ommatostrephes Bartramii* recorded from stomachs of fish taken in Davis strait, etc.

1881. Professor A. E. Verrils [Verrill] to nye Cephalopodslægter: Sthenoteuthis og Lestoteuthis. Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandlinger 1881, pp. [1-27], text f. A-B, pl. 1, 1881.

VAN HOFFEN, E.

[1897. Die Fauna und Flora Grönlands. In Grönland-Expedition d. Gesellsch. f. Erdkunde zu Berlin 1891-1893, 1897.]

NOTE.—For courteous help in the compilation of the foregoing bibliography, as well as securing certain of the works therein noted, thanks are due to Mr. Frits Johansen, formerly of the Canadian Arctic Expedition, 1913-18, and to Dr. Theodor Mortensen of the Copenhagen Museum.

For comparison of the Arctic cephalopod fauna with that of the Antarctic see

BERRY, S. S.

1917. Cephalopoda. Australasian Antarctic Expedition, 1911-1914, Scientific Reports Series C—Zoology and Botany, v. 4, pt. 2, pp. 1–39, text f. 1–30, pl. 10–14, March, 1917.

And the papers cited in the further bibliography there appended.

The Pteropoda Collected by the Canadian Arctic Expedition 1913-18, with description of a New Species from the North Pacific

By William Healey Dall[1]

Honorary Curator of Mollusks, United States National Museum.

A small collection of Pteropoda was referred to me by the Arctic Publications Committee for a request for a report upon them. They consisted mainly of material collected by Mr. Frits Johansen, biologist with the Canadian Arctic Expedition, with a few Opisthobranchs and other specimens added from other northern Canadian localities.

A peculiarity of the expedition series is the absence in great measure of adult specimens, nearly all the specimens of *Clione* and all the specimens of *Spiratella* (*Limacina* of authors), were young, especially the latter; although Mr. Johansen frequently mentions its presence, not a single adult specimen is contained in the series. As most of the specimens were obtained near shore, it may indicate that it is the habit of the young to avoid the open sea until mature.

Clione borealis Phipps.

Station 6 *a*, *b*.[2] Latitude 56° 26′ N., longitude 133° W. June 24, 1913.—One *Spiratella* and one young *Clione* obtained at the surface and near the surface (F.J.).

Station 9*a*. Latitude 55° 2′ N., longitude 144° W., June 27, 1913. Water temperature at 1 p.m. 51° to 51°.6 F. Several young *Clione* and many *Spiratella*. (F.J.)

Station 12*a*, *f*. Latitude 54′ 38° N., longitude 157° 45′ W., June 30, 1913. Water temperature 50°.7 to 51°.3 F. Many young *Clione* and one *Spiratella* from, at or near the surface. (F.J.)

Station 14. Latitude 54° 23′ N., longitude 164° 45′ W., July 2, 1913. One young *Clione* obtained at the surface. (F.J.)

Station 57*a*. Cape Smyth, near Point Barrow, Alaska, August 5, 1916. Several *Clione* were obtained at or near the surface in a strong northerly current. (F.J.)

Station 25*b*, c. Ten miles east of Point Barrow, Alaska, off the Plover islands, August 27-28, 1913. Water temperature 30°.2 to 30°.3 F. Depth about two *fathoms*. One *Clione* obtained. (F.J.)

Station 27*c*. Camden bay, inside of Collinson point, Alaska, September 15, 1913. Several *Clione* captured. (F.J.)

Station 27*a*. Off Collinson point, Alaska, Oct. 5, 1913. One *Clione* from under ten inches of ice in about six feet of water at a temperature of 30° 5 F. (F.J.)

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[1] By permission of the Director of the United States Geological Survey.

[2] The collection[illegible]ons are arranged in order from west to east.

Station 28*k*. Jan. 4, 1914. Camden bay, inside Collinson point, shallow water under four feet of ice; water temperature 28°.5 F. (F.J.)

The following data are derived from Mr. Johansen's notes:

One adult *Clione* was 30 mm. long, the spread of the flippers 20 mm. when alive. The muscles of the tail were clearly visible through the transparent body. The purplish tint of the tail extended with decreasing intensity forward for about 5 mm. The oral tentacles were deep rose purple; the oesophagus rose colour, as also the edge of the body around the base of the parapodia; the intestinal mass was blackish brown. The rest of the body was pale and translucent. The protruded oral tentacles were about 3 mm. long, the hook bearing captacula when fully extended appeared longer.

When swimming, the parapodia were bent toward the ventral side, returning to a nearly horizontal position, and repeating.

The animal came up with the water in a hole cut through the ice and was caught swimming just below the surface film of new ice.

Placed in a bottle of sea water which began to freeze, the animal became immobile among the ice particles. Only after arrival at camp when the ice began melting did it begin to move again. The tail is much used by the animal as a kind of rudder when changing direction of movement. When moving up or down the tail is recurved dorsally or sometimes ventrally. At times the animal would revolve in one place with the tail curved against the side of the body and the fins continually moving. When swimming horizontally it always tried to keep the ventral side downward. When at rest it remained in a vertical position, head downward, or sank upon its ventral side to the bottom of the container. The resting periods were always shorter than those of activity. The fins if brought into contact with ice or the glass of the container, or when the animal is moribund, are folded up and held close to the body. They are subject to extreme contraction when placed in a preservative.

In the warmth of the laboratory the movements decreased and the animal became sluggish, but if the container was placed in a colder situation activity revived. From time to time the animal exuded mucus which seemed to embarrass its movements. On January 5, the container was put in a cool place and the water congealed during the night. When thawed the Pteropod was still alive, though less active and this was continued for a week. January 12, it died, having been kept for eight days without renewal of water or food.

Station 37*r*. Inner harbour at Bernard harbour Dolphin and Union strait, Oct. 16, 1914. Under four inches of ice in about seven feet of water at a temperature of 30°.1 F. One adult *Clione*. (F.J.)

Station 43*a*. Off Cockburn point, Dolphin and Union strait, September 13, 1915. Water temperature 32° F. about fifty fathoms deep. One *Clione* obtained. (F.J.)

In view of the fact that so many good dissections have been published of this species, and that nearly all the specimens were immature and not in the best condition, it is not thought worth while to attempt anatomical work upon them.

It may be noted that young are more deeply tinted than the adults and one specimen of which Mr. Johansen has made a rough coloured sketch is quite noticeably red, while others are less so.

Spiratella pacifica Dall?

This genus is more generally known by the name of *Limacina*. The minute young specimens in the collection, perhaps from being preserved with formalin, have lost their shelly matter, and it is impossible to say whether they belong to the Pacific type or to the better known and much more common Atlantic species *S. helicina* Phipps.

Station 13*g*, *h*. Latitude 54° 30′ N., longitude about 157° W., June, 1913. In marine plankton, numerous young mixed with young *Clione*. (F.J.)

Station 6*a*, *b*. Latitude 56° 26′ N., longitude 133° W., June 24, 1913. One *Spiratella* from the surface. (F.J.)

Station 9*a*. Latitude 55° 02′ N., longitude 144° W., June 27, 1913. With marine Plankton, numerous larval or very young specimens mixed with young *Clione*. (F.J.)

Station 12*a*, *f*. Latitude 54° 38′ N., longitude 157° 45′ W., June 30, 1913. Water temperature 50°.7 to 51°.3 F. One *Spiratella* with many young *Clione*, from at or near the surface. (F.J.)

Station 13*a*, *f*. Latitude 54° 30′ N., longitude 159° 42′ W., July 1, 1913. Water temperature 47°.5 to 48°.1 F. Many *Spiratella* at or near the surface. (F.J.)

Station 15*a*, *f*. Latitude 55° 22′ N., longitude 165° 45′ W., July 3, 1913. Noon to 3 p.m. Many *Spiratella*. (F.J.)

Station 20*a*. Grantley harbour, Port Clarence, Alaska, July 30, 1913. Several *Spiratella* from the surface. (F.J.)

Station 40*d*. Off Bernard harbour, Dolphin and Union strait, June 8, 1915. Depth of water nine fathoms, temperature 32° F. Six vertical hauls through a hole in the ice to five fathoms depth, produced several veliger larvae of *Spiratella*. (F.J.)

Station 46*k*. Off west end of Chantry island, in Dolphin and Union strait, June 10, 1916. Depth of water about eight fathoms, the temperature 32° F. A vertical haul through four feet of ice to depth of five fathoms produced several veliger larvae of *Spiratella*. (F.J.).

Specimens from other Sources

Clione borealis Phipps.

1. Half digested young from the stomach of *Myotocephalus grönlandicus*, Nain, Labrador; collected by Owen Bryant, 1908.

2. Port Burwell and Wakeham Bay Ungava, *Neptune* Expedition; collected by A. Halkett, 1904.

3. Black Tickle, Labrador; collected by A. Halkett, 1903.

Larval Gastropod

Station 13*a*, *c*. Latitude 54° 30′ N., longitude 159° 42′ W. Specimen in marine plankton, not identifiable.

Gastropteron (**pacificum** Bergh var.?) **cinereum** Dall, n. sp.

1. Skidegate inlet, Queen Charlotte islands, British Columbia, July, 1910, W. Spreadborough, collector. Victoria Memorial Museum, Mollusks, No. 3177; cotype, presented to United States National Museum.

2. West side of Vancouver island, Ucluelet, British Columbia at low tide, C. H. Young and W. Spreadborough, May, 1919. Cotype, Victoria Memorial Museum, Ottawa, Cat. Mollusks, No. 3176. (Fig. 4).[1]

[1]Drawn from alcoholic specimen, by Claude E. Johnson, artist of Biological Division, Victoria Memorial Museum. The lack of lateral symmetry is probably due to contraction in the preservative medium.

Both the North Atlantic, Asiatic, and North Pacific species of *Gastropteron* are of a reddish colour sprinkled densely with darker red dots. The present form is of a uniform dusky slate colour and of a smaller size than the Pacific species described by Bergh. It is an interesting addition to the sparse list of known species. The spread of the parapodia totals 10 to 15 mm., the length of the body 8 to 11 mm. (in spirits), in the living state it was probably larger. The anterior shield is about one-third the whole length of the body. Like *G. pacificum*, it lacks a posterior flagellum on the mantle.

Fig. 4.—*Gastropteron (pacificum* Bergh var.?) *cinereum* Dall, new species. Left, dorsal aspect; right, ventral. X 4. Upper outline figure, natural size.

Eggs of fish?

Station 7*a*, *b*. Latitude 55° 42′ N., longitude 136° 20′ W., June 25, 1918. Eggs, probably of fish, were found floating on the surface. (F.J.)

Young of Sipunculoid worm?

Station 57. 1 fathom in marine plankton, off Cape Smyth, near Point Barrow, Alaska.

This puzzled our experts, but is left without positive determination, being badly contracted by the preservative.

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